

# Monitoring Flour Fortification Programs: An Overview

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International Micronutrient Malnutrition and Control  
(IMMPaCt) Program

Centers for Disease Control and Prevention (CDC)

[www.cdc.gov/impact](http://www.cdc.gov/impact)

# Topics

- **Monitoring definition and concepts**
- **Food fortification monitoring system overview**
- **General principals for setting up a monitoring system**
- **Data sources for monitoring**
- **Evaluation definition and concepts**
- **Decisions to make when setting up an evaluation of a flour fortification program**
- **Examples**

# Monitoring & Evaluation (M&E)

- M = An ongoing process of collecting, analyzing and interpreting data, to compare how well a program/project is being executed against expected results
- E = Objective assessment of a program or project that covers its design, implementation, impact, efficiency and sustainability

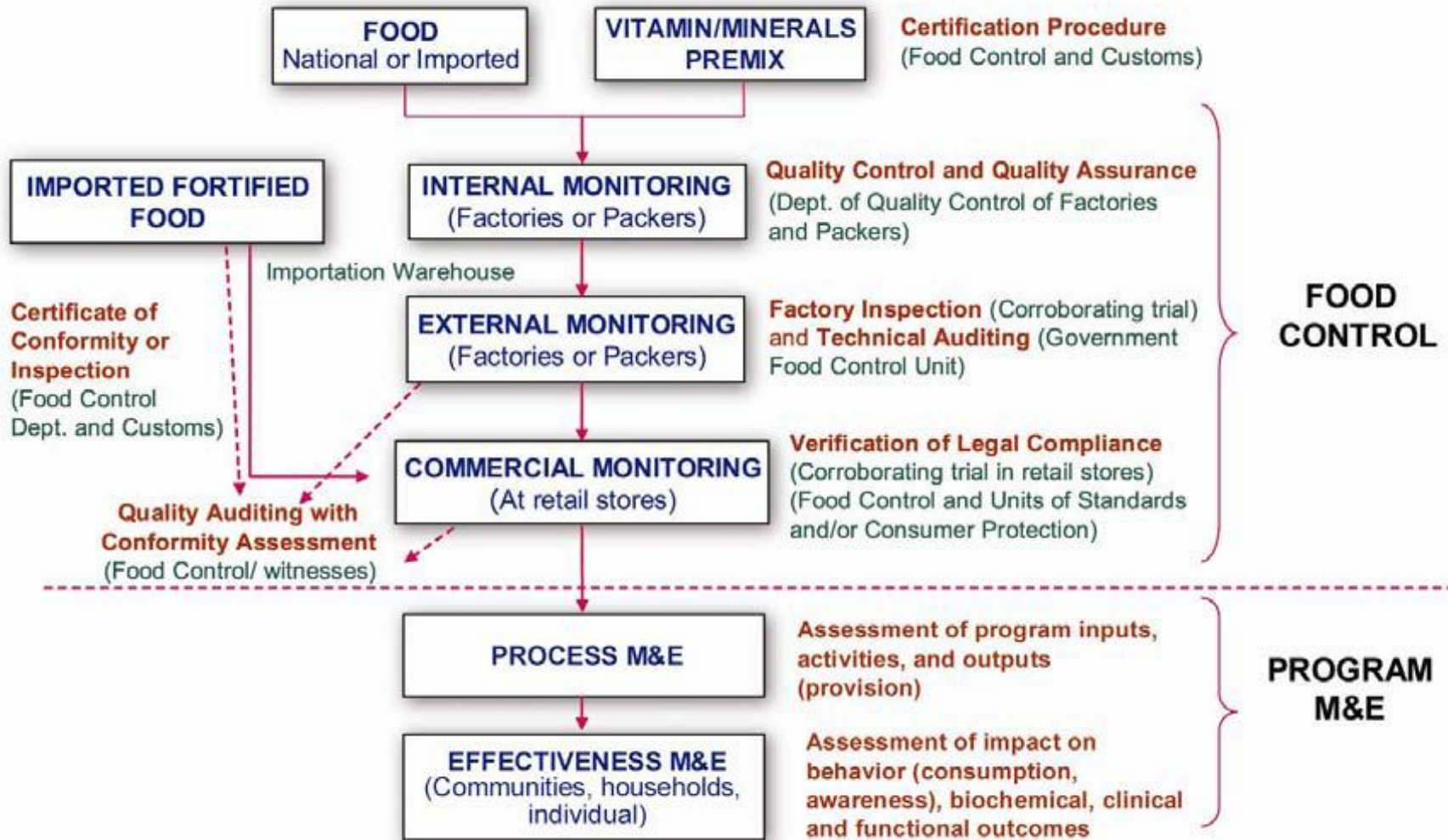
# Monitoring & Evaluation (M&E)

- Translates objectives into indicators based on expected results
- Reports progress to managers and alerts them to problems, in order to implement timely remedial actions
- Helps sustain successful activities of programs or projects

# Goals and Objectives

- **Goal**: a broad statement of a desired, long-term outcome of the program
- **Objectives**: statements of desired, specific, realistic, and measurable program results
  - SMART
    - **Specific**: identifies concrete events or actions that will take place
    - **Measurable**: quantifies the amount of resources, activity, or change to be expended and achieved
    - **Appropriate**: logically relates to the overall problem statement and desired effects of the program
    - **Realistic**: Provides a realistic dimension that can be achieved with the available resources and plans for implementation
    - **Time-based**: specifies a time within which the objective will be achieved

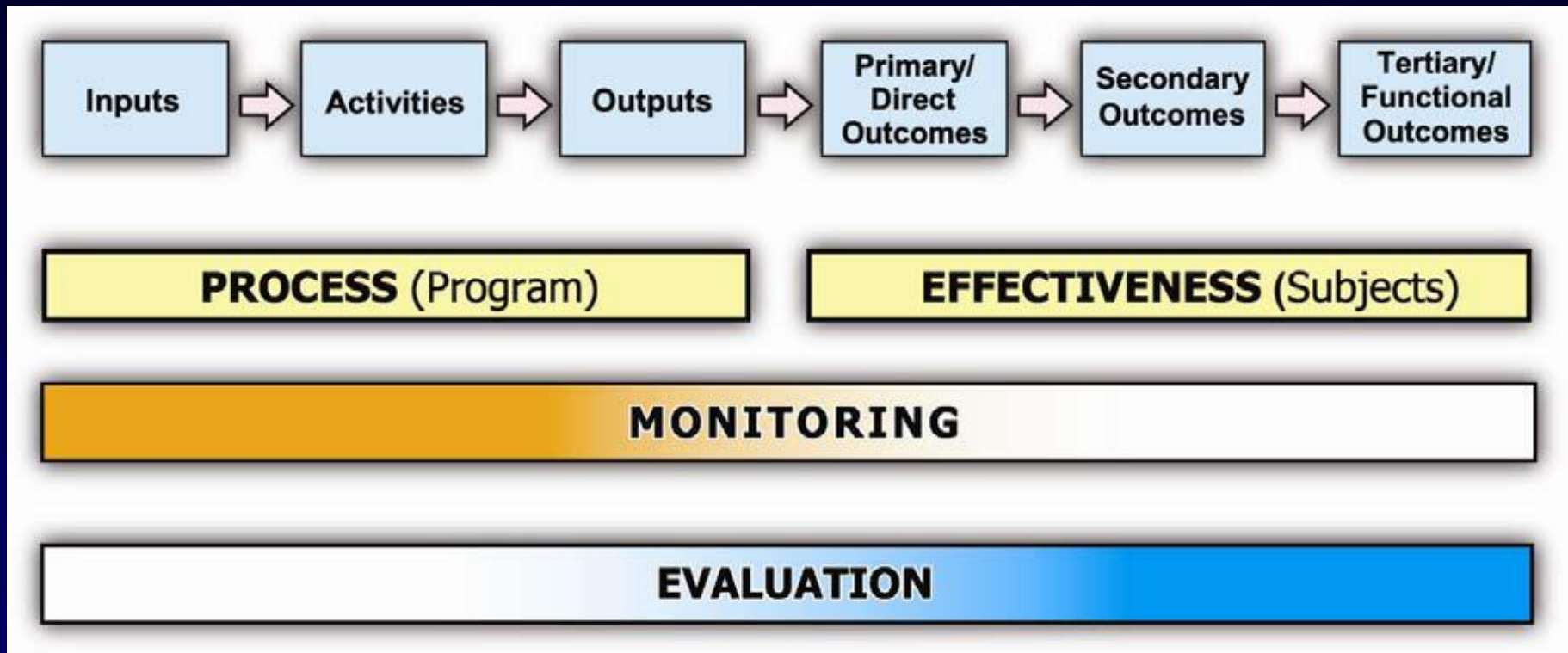
# Framework for monitoring flour fortification programs



# Process (Program) monitoring

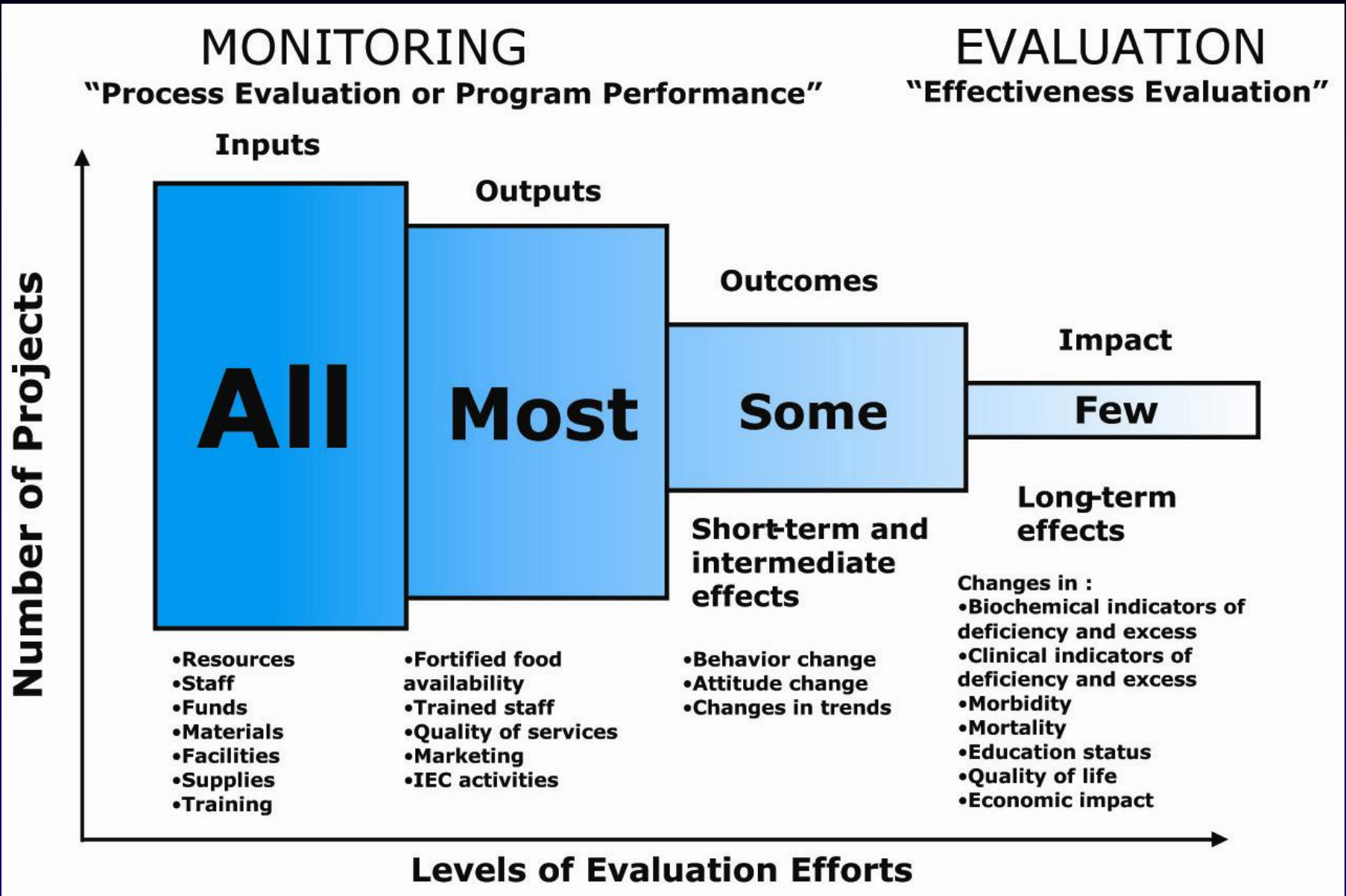
- Inputs extend to the financial, human, and material resources used for a program
- Activities are the specific actions taken or work performed through which inputs, such as funds, technical assistance and other types of resources are mobilized to produce specific outputs.
- Outputs include the products, capital goods and services that result from an intervention, which are relevant to the achievement of outcomes
- Outcomes extend to the likely or achieved effects, or impact of a program in the target population.

# Logic model of M&E





# Monitoring and Evaluation pipeline



# Flour Fortification Monitoring System Overview

# Why monitor a flour fortification program?

1. To ensure that fortified flour meet nutrient content and safety standards
2. To assess access, utilization and coverage of fortified flour by the people (the consumer)
3. To effectively manage and sustain the fortification program to eliminate vitamin and mineral deficiencies

# What is an indicator?

- Indicators are signs or markers that inform the relevant parties whether the program objectives or being achieved

## An indicator should be:

- Valid –correctly measures what it is intended to measure
- Simple and measurable – e.g. the label or logo on a sack of fortified flour
- Reliable – i.e. provides consistent and reproducible results on repeat measurements.

## An indicator should also be:

- Timely - can be measured at appropriate intervals to detect the expected change.
- Programmatically important - e.g. legal monitoring shows that sufficient quality fortified flour is produced or imported to meet the needs of the target population.
- Comparable – data are collected using the same methodology and tools, so that the results can be compared

# Monitoring system

- **Access:** is fortified flour available and affordable to the target population?
- **Utilization:** is fortified flour being purchased by the target households?
- **Coverage:** is fortified flour being consumed by the target population?
  - At what percent?

# Indicator example #1

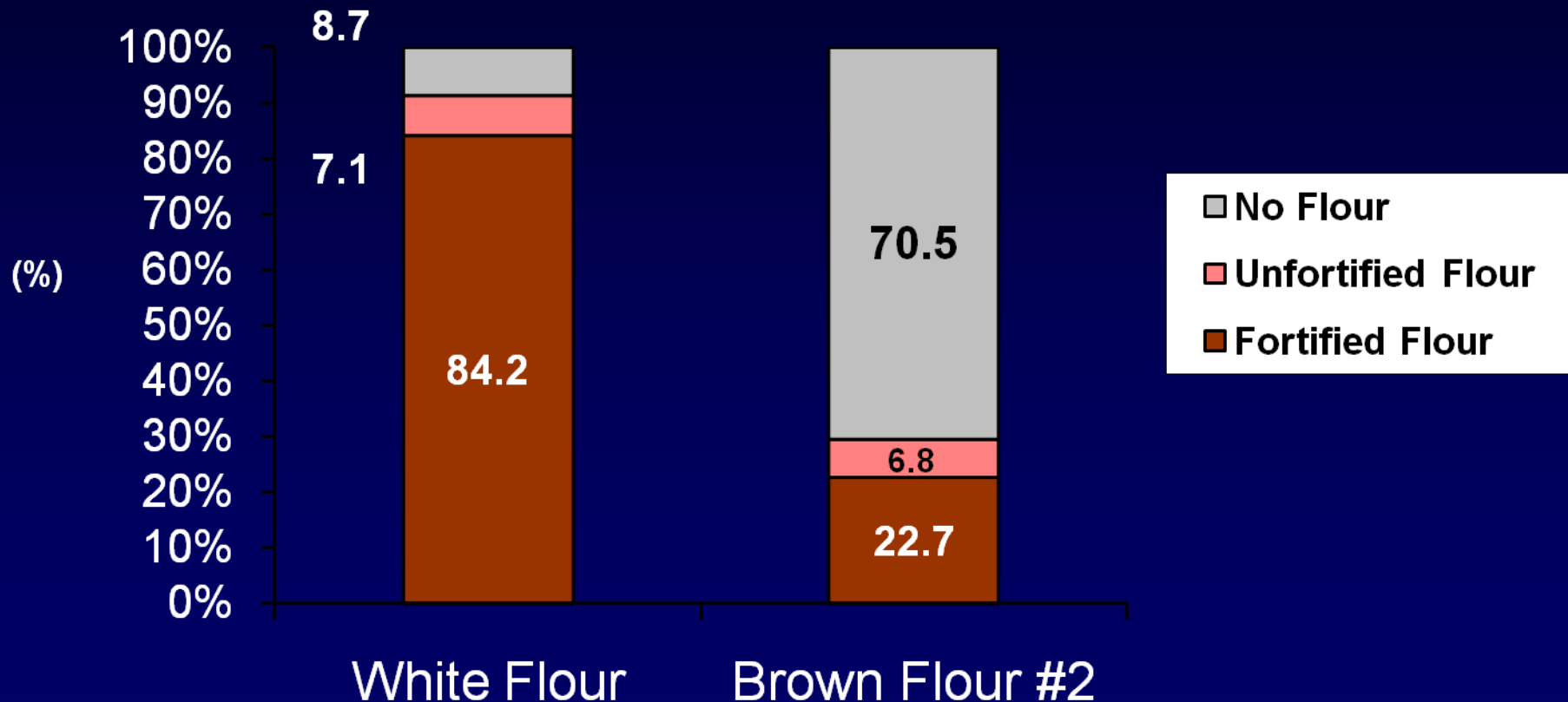
Question	Measure	Indicator
<p><b><u>Access:</u></b> <b>is fortified flour available and affordable to the target population?</b></p>	<p>Increased production / importation of fortified flour according to specifications</p>	<p>•Proportion of fortified / unfortified flour produced or imported</p>



## Indicator example #2

Question	Measure	Indicator
<p><b><u>Utilization:</u></b> <b>is fortified flour being purchased by the target households?</b></p>	<p>Increased purchase of fortified flour and by products</p>	<p>•Proportion of households with flour “labeled” as fortified</p>

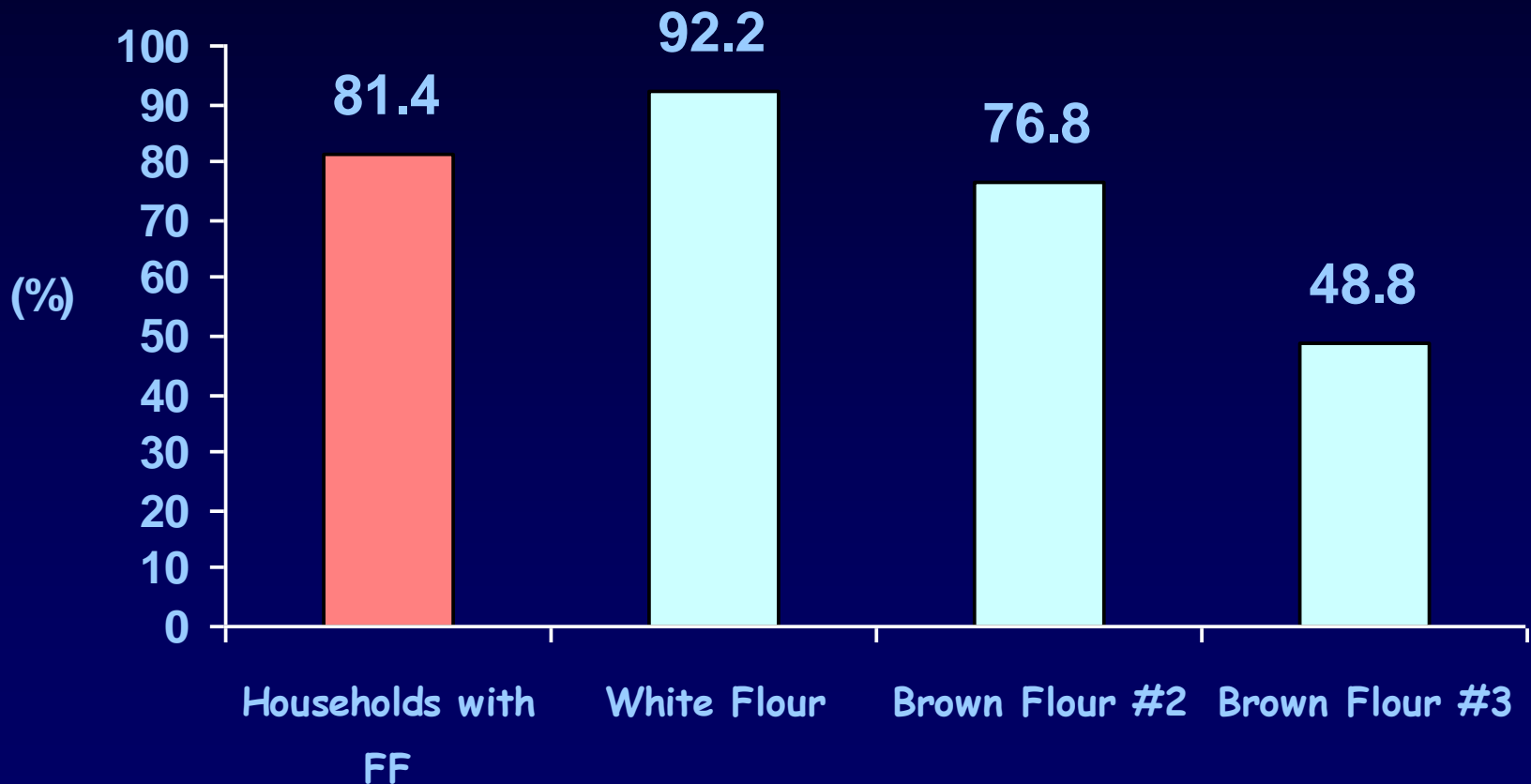
# Percent of households with flour specimens positive with iron spot test, by type of flour



# Indicator example #3

Question	Measure	Indicator
<p><b><u>Coverage:</u></b> <b>is fortified flour being consumed by the target population?</b></p>	<p>Increased proportion of non-pregnant women (15-49) regularly consuming fortified flour</p>	<p>•Proportion of non-pregnant women (15-49) regularly consuming fortified flour</p>

# Percent of households with fortified flour and by type of fortified flour, Oman 2004

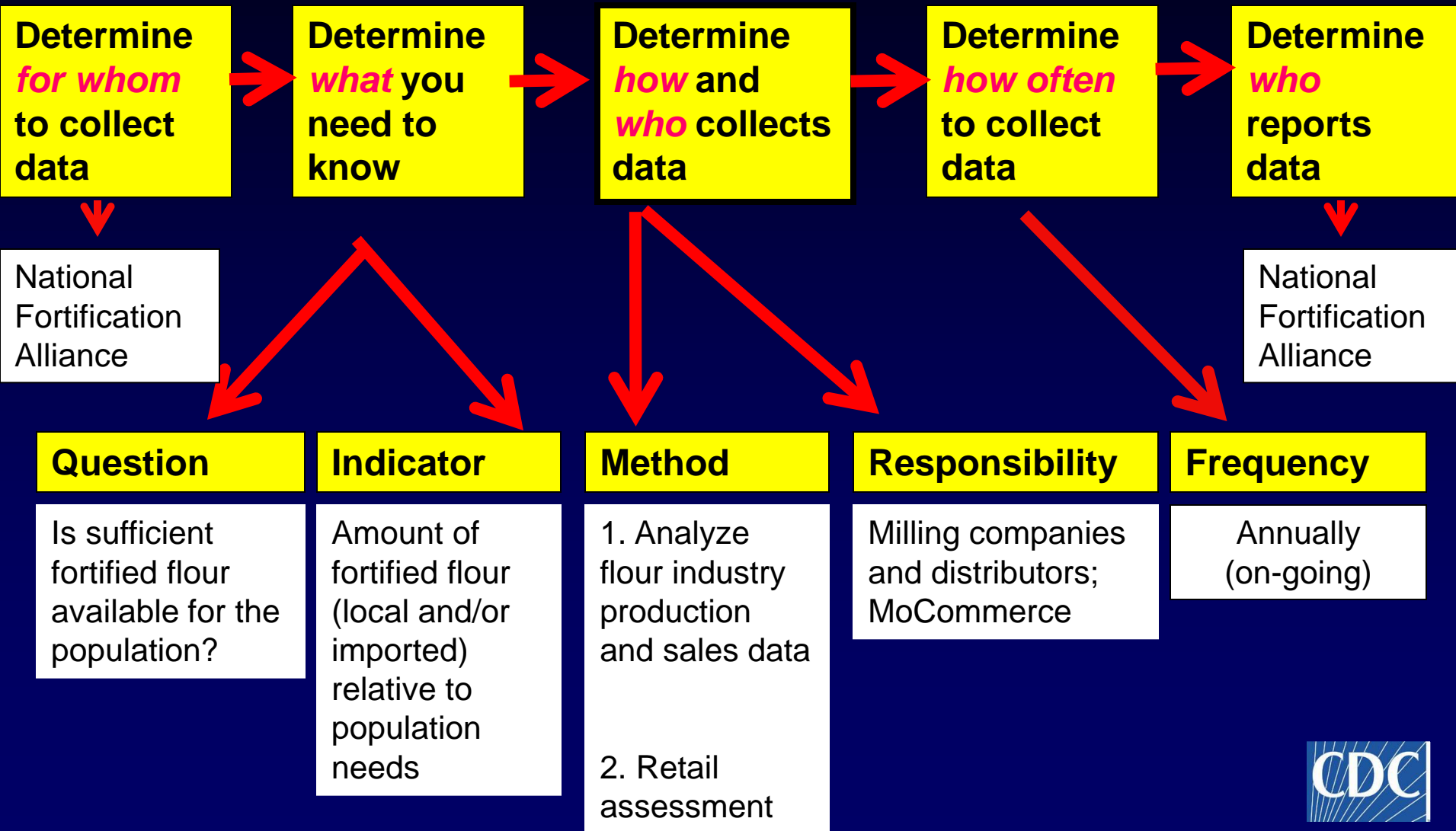


# General principals for setting up a monitoring system

1. Responsibility at each level needs to be clear:
  - a) **For whom** are the data collected (stakeholders)?
  - b) **What** data are collected (questions and indicators)?
  - c) **How** are the data collected (methodology)?
  - d) **Who** collects the data (personnel)?
  - e) **When** are the data collected (frequency)?
  - f) **Who** analyzes the data?
  - g) **Who** reports the data and **when**?
  - h) **Who** does what based on the information?

# Example: Process monitoring of flour fortification

Is sufficient fortified flour accessible?



# Monitoring implementation

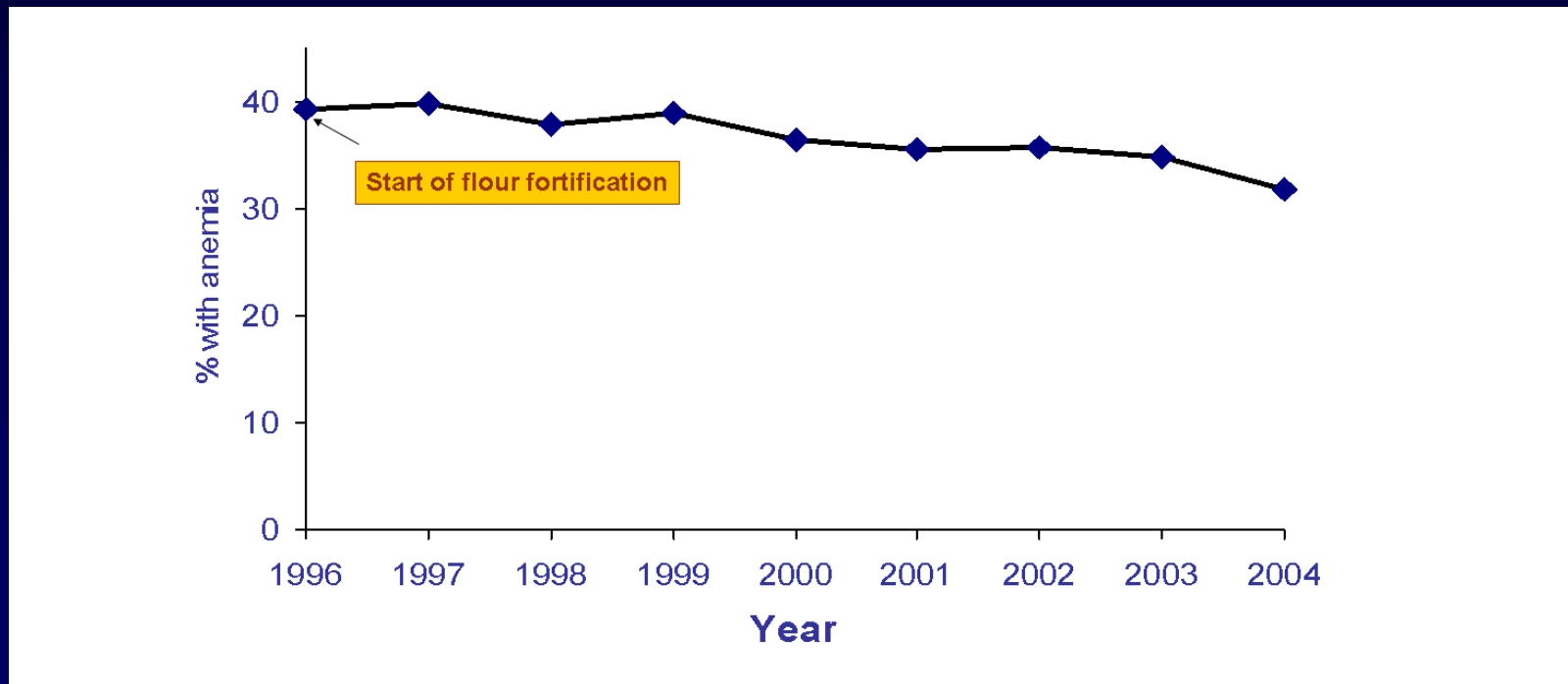
- Do **pilot run of monitoring system** (data collection, analysis, and reporting process) to:
  - **Correct potential problems**
  - **Allow “Stakeholders” to experience the system and:**
    - ✓ **Their role, level of effort, and importance in the process**
    - ✓ **The specific kinds of information that would be available to them through the monitoring system**

# Data Sources for Monitoring

- Existing data systems
  - Health statistics data; anemia from ANC
  - Multiple Indicator Cluster Surveys (MICS)
  - Reproductive health surveys
  - Household Income and Expenditure Survey (HEIS)
  - Other surveys from other sectors (NGOs, government, Universities, etc)
- New data systems
  - Micronutrient Survey



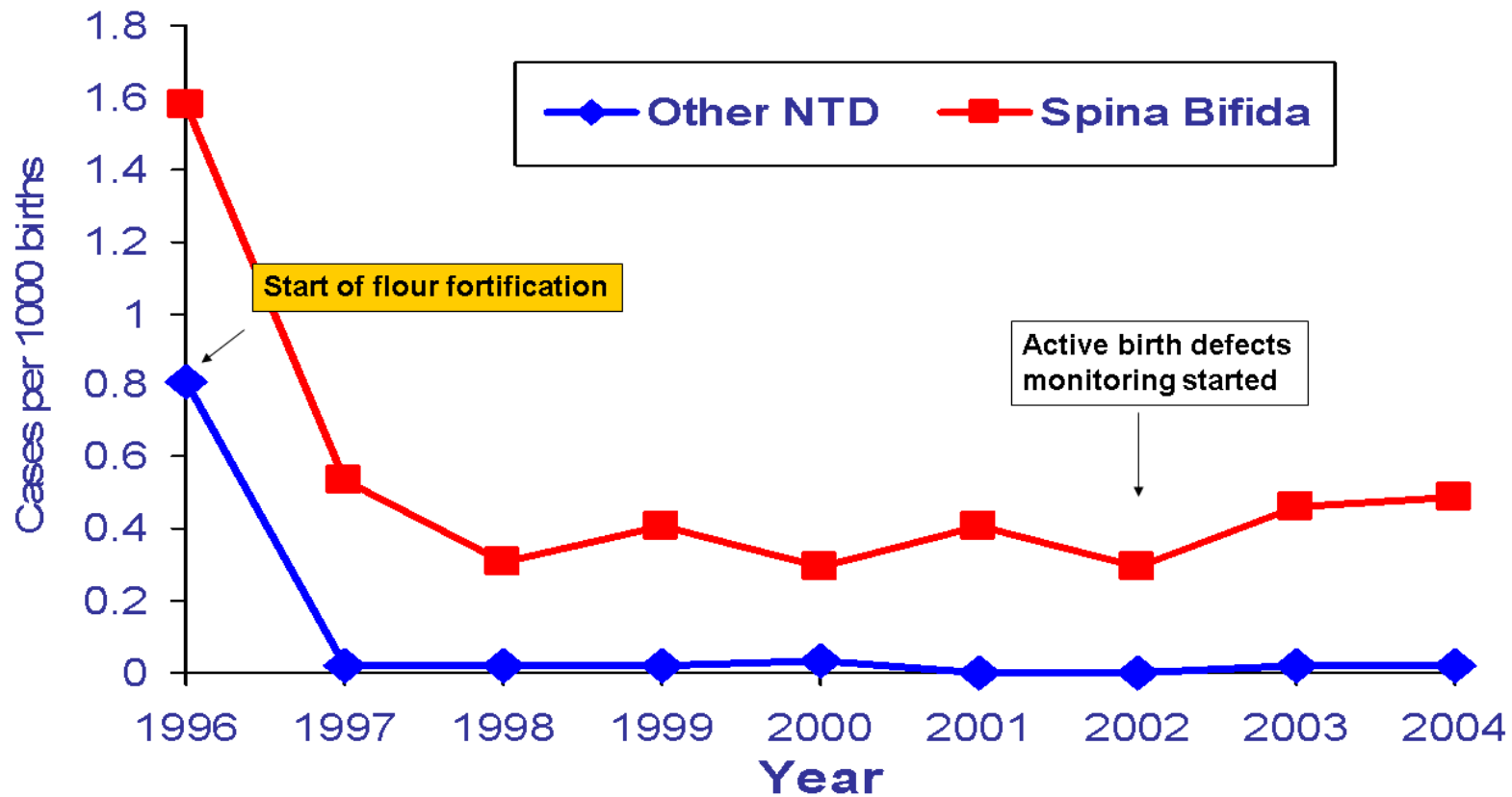
# Trends in anemia prevalence screened at first antenatal clinic visit, Oman



# Data Sources for Monitoring

- Sentinel monitoring (purposive sampling)
  - Schools
  - Worksites
  - Public health clinics
  - Hospitals
- Qualitative research and reports
  - Universities
  - Industry

# Trends in Incidence of Spina Bifida and other NTDs, Oman



**Remember ....**

**There Are No Perfect  
Monitoring Systems**

**Only**

**“Best We Can Do” Ones**

\*Parvanta, 2003

# Program Evaluation

Objective assessment of a program that covers its need, design, *implementation*, impact, effectiveness, efficiency and sustainability

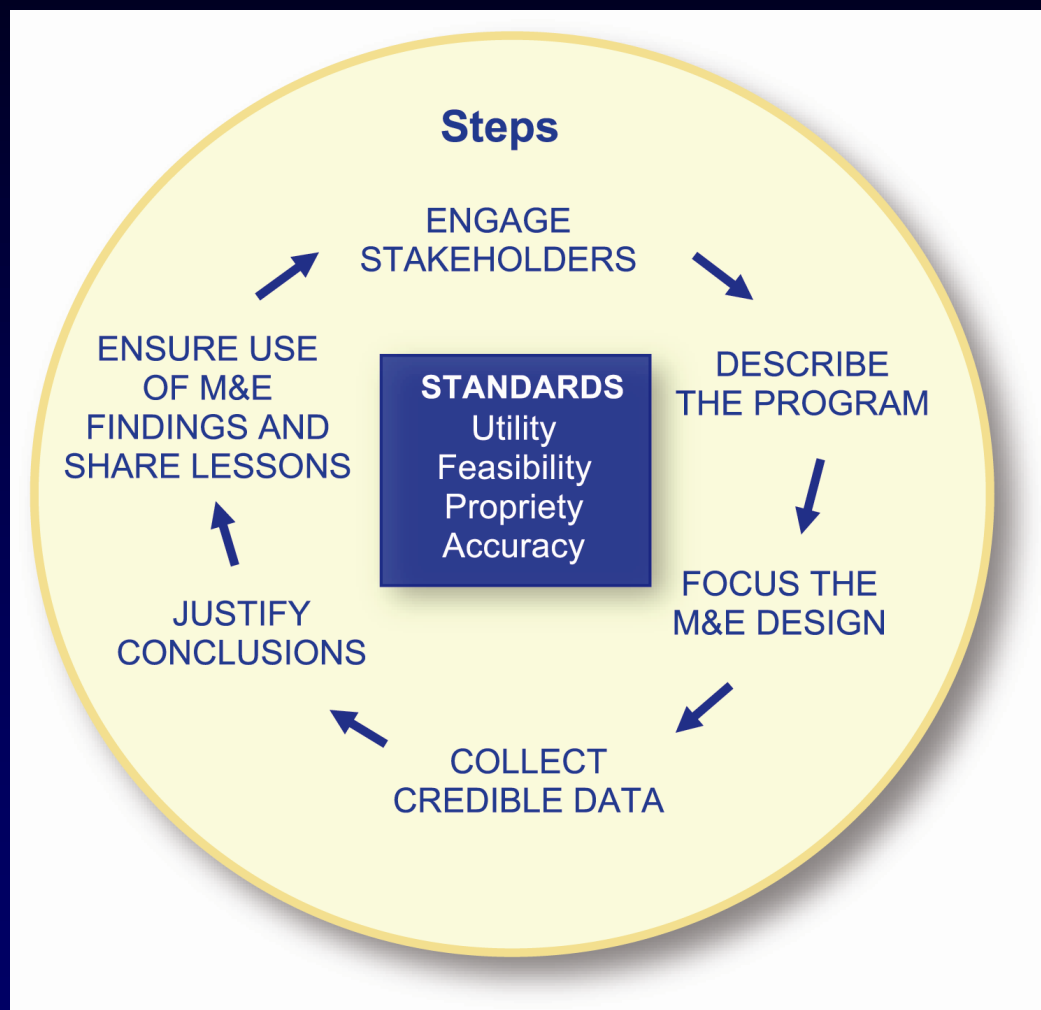
# Aim of evaluation

- **Analyzes why intended impacts were or were not achieved**
- **Explores unintended results**
- **Informs practice, decision-making and policy**

# Evaluation questions

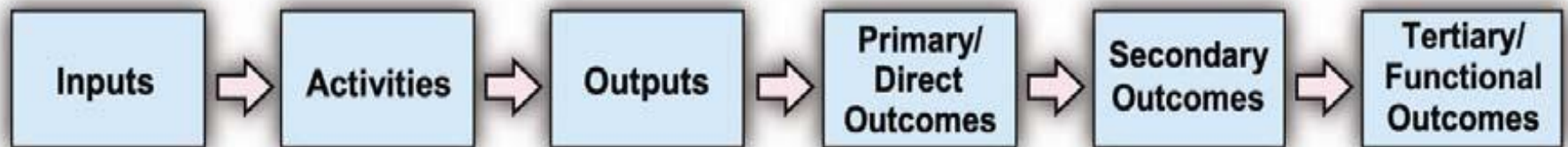
- Does the intervention achieve the intended purpose?
- Can the changes in outcomes be explained by the intervention, or by some other factors occurring simultaneously?
- Do intervention impacts vary across different groups of intended beneficiaries, regions, and over time?
- Are there any unintended effects of the intervention, either positive or negative?
- How cost-effective is the intervention in comparison with alternative projects?

# Steps in designing a flour fortification monitoring & evaluation system





# Describing the program: Logic Model for M&E



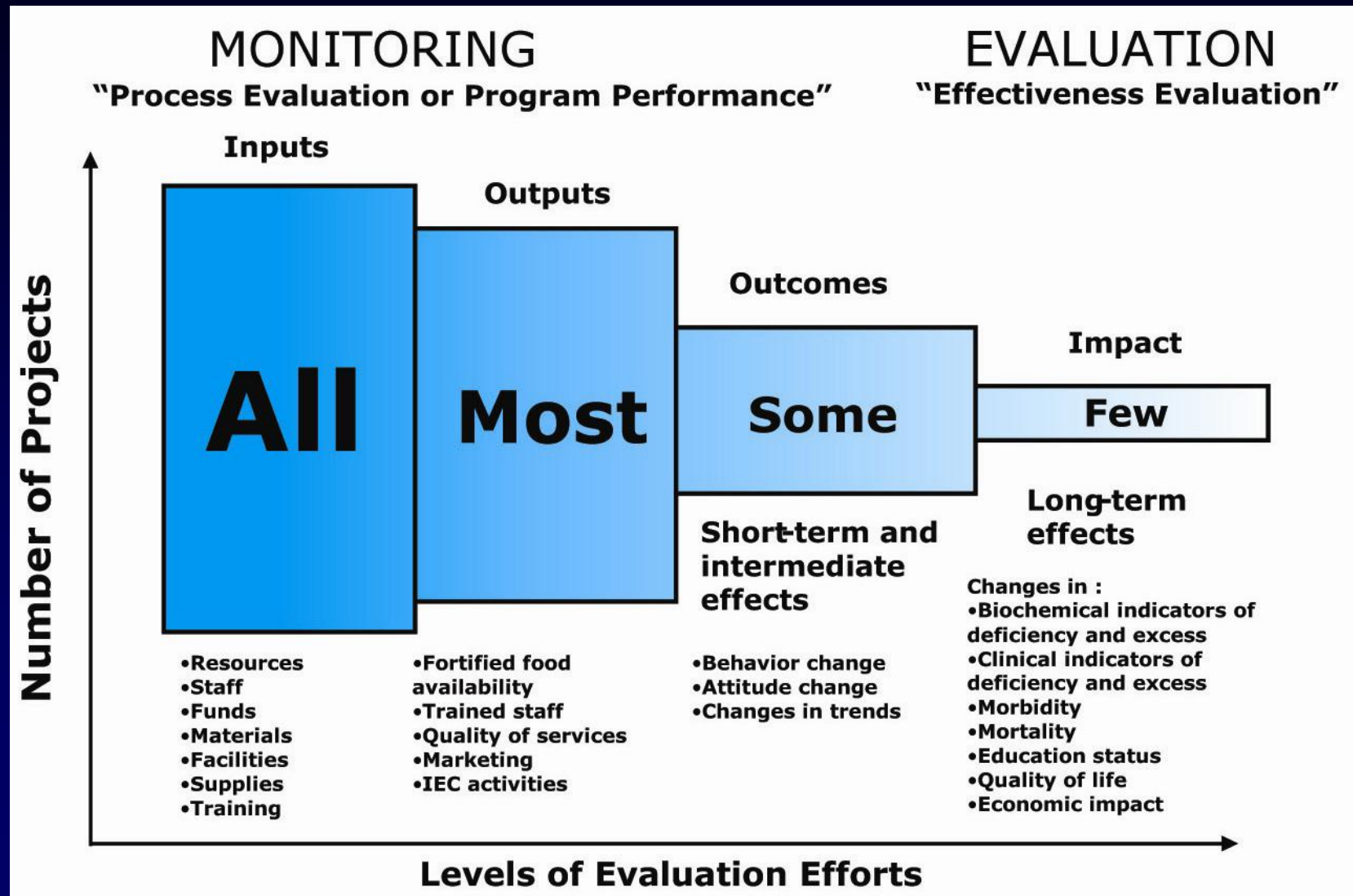
**PROCESS** (Program)

**EFFECTIVENESS** (Subjects)

**MONITORING**

**EVALUATION**

# Monitoring & evaluation pipeline



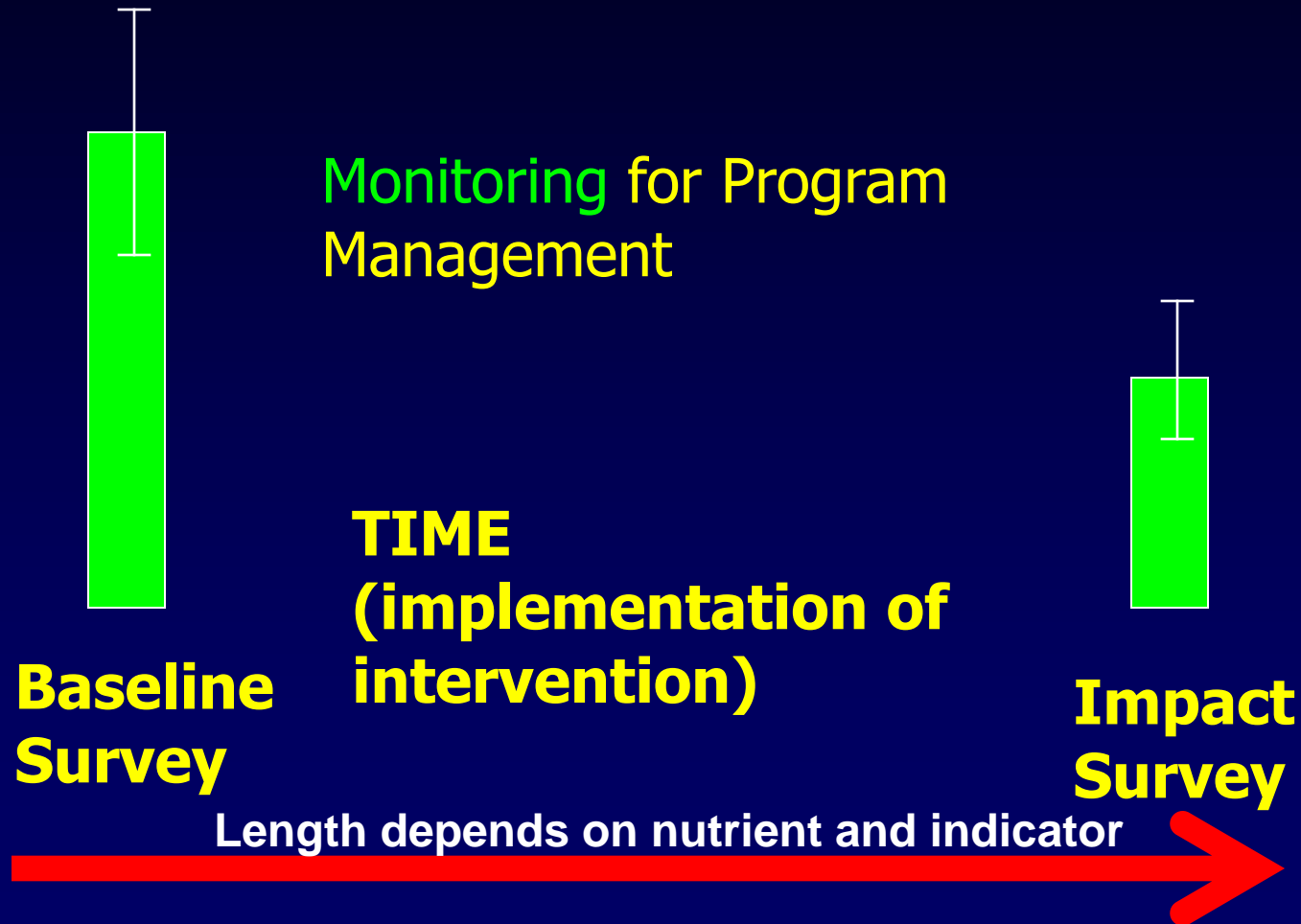
# Collecting credible data

- Depend on the purpose of the evaluation
- Can be simple and not costly ... or very complex and expensive




# Evaluation expectations

- To reduce the prevalence of nutrient deficiencies **>80% population coverage** of quality fortified flour/flour products must be sustained for at least one year at a time.
- Maximum public health benefits will take multiple years.
- Communication and social marketing critical (must be on-going).
- The trend in public health impact will depend on the initial prevalence of nutrient deficiency.

# Ideal Program Monitoring and Evaluation System



# Example with flour fortification and reduction of iron deficiency in women

- Baseline and survey 2-3 yrs after  • Allow to say if there was a change in iron deficiency level or not
- Baseline and survey 2-3 yrs after, looking at potential confounding factors  • Allow to say that impact may be related to the program
- Baseline + end survey with control  • Allow to say that the impact is more likely due to the program

# Choice of indicators

- Effectiveness indicators are related to outcomes
  - Change in behaviours
  - Consumption of foods/micronutrients
  - Biochemical/ physiological/ functional
    - For anemia: hemoglobin, serum ferritin, inflammatory responses (CRP, AGP) and others if budget allows

# How to decide which indicators to use to determine impact?

## Consider:

- Can **on-going data be collected** on biological indicators (e.g. hemoglobin, serum ferritin or folate) to assess trends in iron status of population?
- Local **capacity** – laboratory, personnel, field logistics, budgetary resources
- Local **culture** (e.g. collection of venous vs. capillary blood)
- **How are data collected?** Are data collected through survey or on-going program based or sentinel monitoring system?
  - staff training and assuring data quality
- Will indicator show “timely” **change**?
  - How often to report to stakeholders?

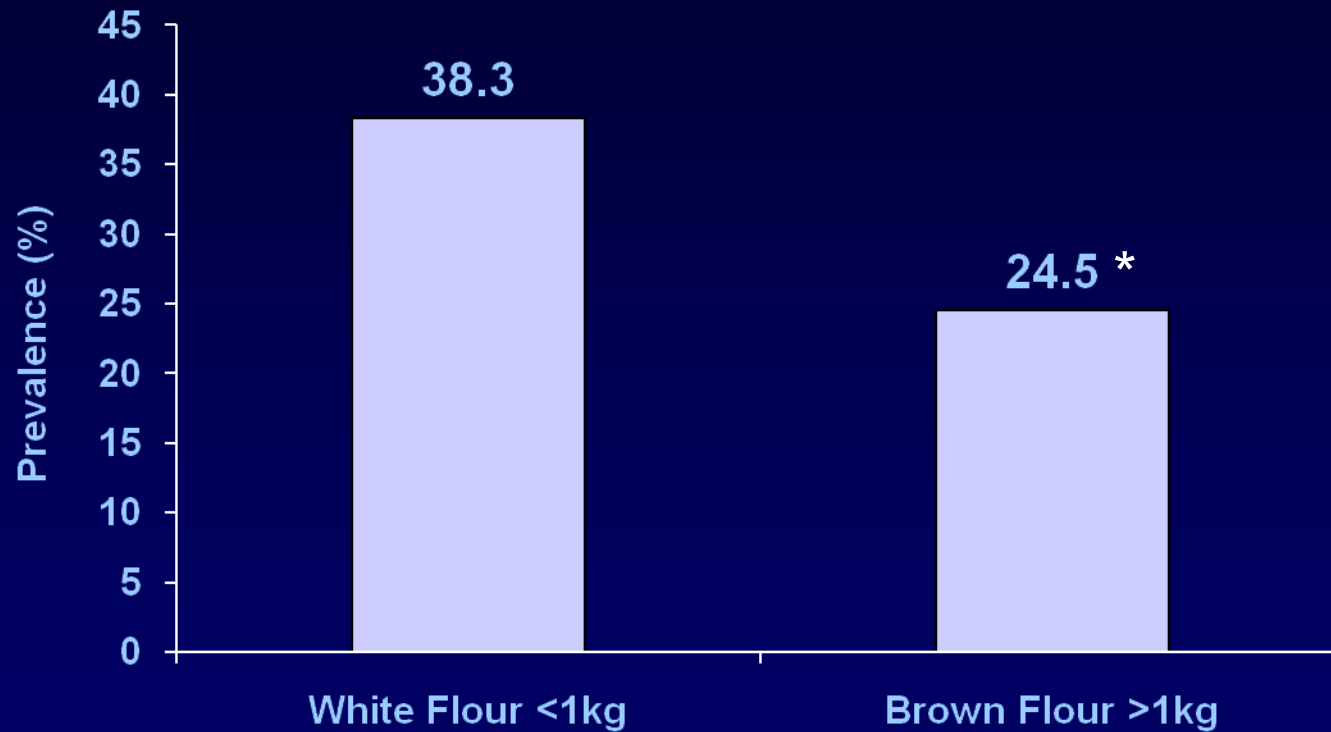


# Data sources for evaluation

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- **Population based monitoring (GOLD STANDARD):**
  - **Periodic national/sub-national cluster surveys**
- **Program based monitoring:**
  - **Health Center based (e.g. 1<sup>st</sup> trimester pregnant women). Sentinel health centers.**
  - **Mothers of children seen in Health Center**
  - **School based monitoring. (Sentinel schools)**
  - **Large employers of female workforce. (Sentinel worksites)**

# Prevalence of iron deficiency in women of childbearing age by per capita/month consumption of white flour



\*  $p < 0.05$

# Example from flour fortification program in South Africa



# Micronutrient Status of non-pregnant women of reproductive age before and after implementation of national flour fortification

	Pre-fortification Period (95% CI)	Post-fortification Period (95% CI)	p-value
Serum Folate < 2.5 ng/ml	16.3%	0%	0.001
Red Blood Cell Folate < 164 ng/ml	26.4%	1.9%	0.000
Serum Ferritin <12.0 µg/ml	25.0%	25.0%	0.74
Hemoglobin <11.0 g/dl	7.5%	5.0%	0.51
Vitamin B12 <145 pg/ml	6.3%	11.3%	0.16

Modjadji SEP., Alberts RL. Folate and iron status of South African non-pregnant women of childbearing age before and after fortification of foods. SAJCN: Vol 20, No 3; 89, 2007.

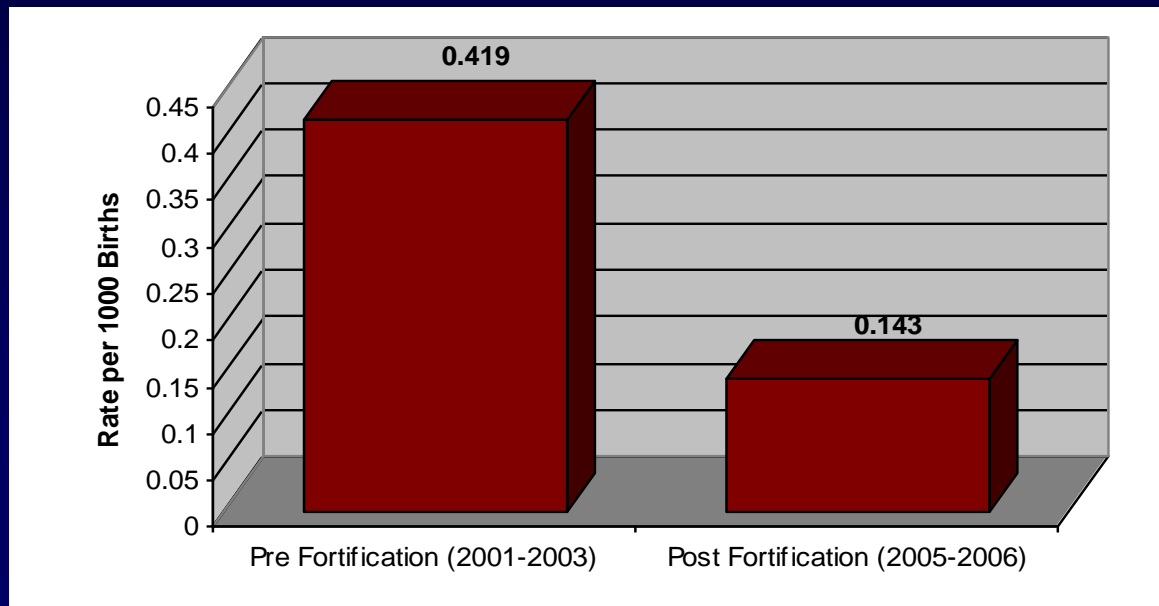
# Neural Tube Defects Surveillance System

- NTD surveillance system was established in 2002
- 12 public hospitals in 4 provinces
- 53,000 births/year were monitored since 2002
- Prevalence of NTDs was reduced by 30.5% after mandatory fortification ( $p < 0.05$ )

# Perinatal Mortality Surveillance System

- Causes of death up to seven days of age are recorded through 164 sentinel health care facilities
- NTD perinatal mortality decreased by 65.9% ( $P < 0.001$ )
- As a control, the perinatal mortality rate of hydrocephalus, unrelated to NTDs, did not change significantly ( $P = 0.77$ )

## Reduction in Perinatal Mortality Rates from NTDs in South Africa



Sayed AR., Bourne D., Pattinson R., Nixon J., Henderson B. Decline in the prevalence of neural tube defects following folic acid fortification and its cost-benefit in South Africa. Birth Defects Res A Clin Mol Teratol. 2008 Apr;82(4):211-6.

# How often to evaluate?

- Done **periodically** but not frequently
- Elaborates on the information on program implementation and impact generated through the ongoing monitoring system
- it is often targeted to problems identified through the monitoring process

# When to perform an impact evaluation?

- Once process monitoring system indicates:
  - Adequate program implementation
    - Need regular production and distribution of fortified product
    - Usually after 1 yr, more often after 18-24 mo
  - Adequate program coverage for minimum period (depends on target nutrient)

**Not Before!**

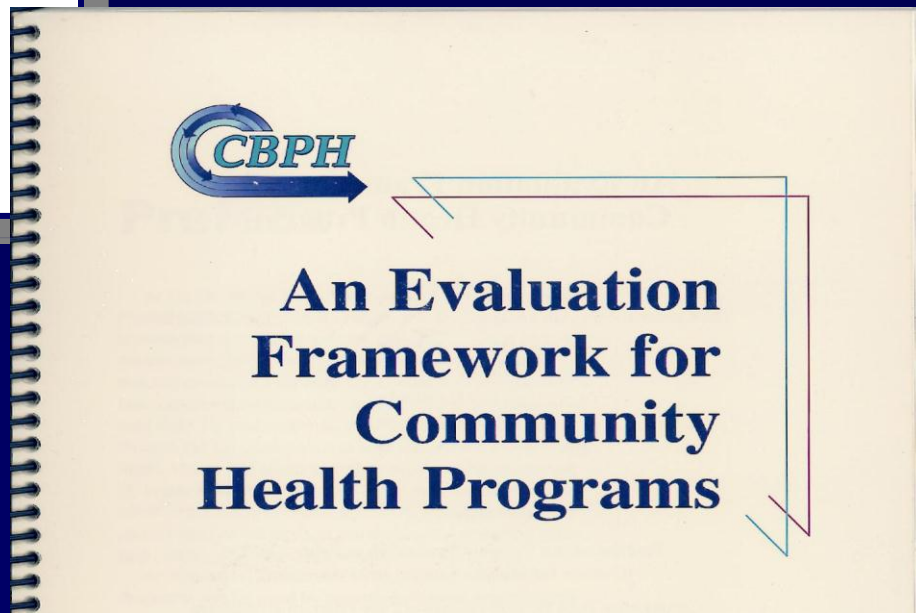
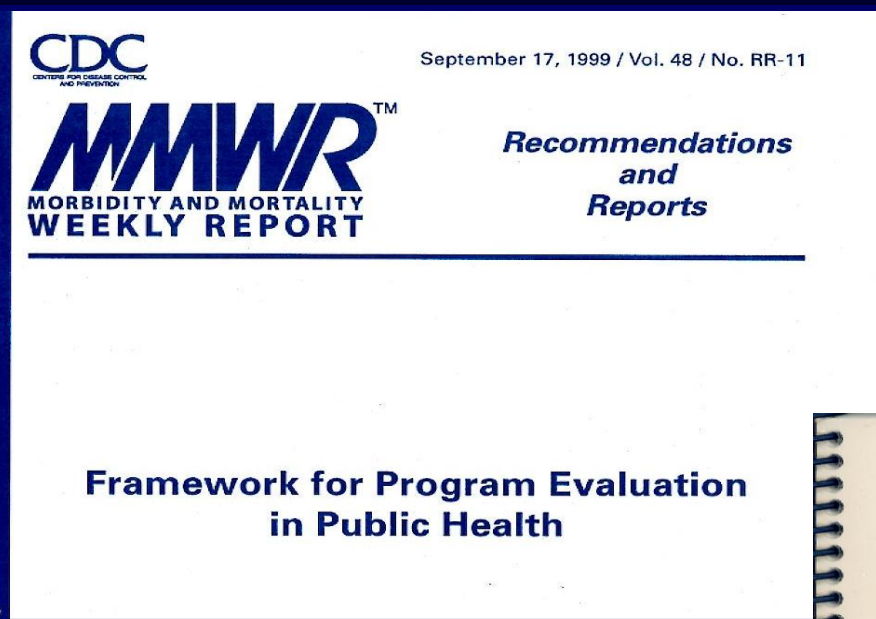


# Justifying and sharing conclusions

- Critical to sustain successful aspects and adapt program if improvements required
- Compare data from various sources (if available)
- Get stakeholders involved to embrace results and take actions
- Communicate and disseminate

# Helpful Publications

[www.cdc.gov/eval](http://www.cdc.gov/eval)



# Helpful Resources:

- NEW! Intro to Program Evaluation for PH Programs—  
A Self-Study Guide:  
<http://www.cdc.gov/eval/whatsnew.htm>
- Innovation Network:  
<http://www.innonet.org/>
- W.K. Kellogg Foundation Evaluation Resources:  
<http://www.wkkf.org/programming/overview.aspx?CID=281>
- University of Wisconsin-Extension:  
<http://www.uwex.edu/ces/lmcourse/>

# Thanks!

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**Monitoring and Evaluating  
Food Fortification Programs:  
General Overview Technical Consultation July 7, 2006  
USAID - [www.a2zproject.org](http://www.a2zproject.org)**

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